MODEL C82233 SETPOINT PROGRAMMER

OPERATING MANUAL

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ADDENDUM #1

MODEL C82233 SETPOINT PROGRAMMER OPERATING MANUAL

USING EVENT #3 FOR PROGRAMMING THE LOCAL/REMOTE SETPOINT SELECTION FOR TEMPERATURE CONTROLLERS AT THE END OF THE PROGRAM.

BACKGROUND:

A "LOCAL" Setpoint means that the setpoint is the value or setting on the panel mounted DigitSwitch. Likewise, "REMOTE" means that the setpoint is determined by the four decades of BCD information present at the DIGITAL INTERFACE PORT located at the rear of the controller.

REMOTE OR LOCAL SETPOINT SELECTION CONTROL BY EVENT #3 ON THE PROGRAMMER:

This feature only works with a controller that has its LOCAL/REMOTE switch in the REMOTE position.

A mini-jumper is located on the upper right corner of the main circuit assembly board as viewed from the front of the programmer.

There are three locations for the mini-jumper to be installed:

A. Position "A" disconnects the remote line (line 23) from ground in the cable going to controller. This allows a "local/Remote" selection to be performed by connecting pins 9 to 10 on the small relay Board (A1493).

B. Position "B" allows control of the Local/Remote Mode selection by Event #3. Turning ON Event #3 sets the Setpoint Selection to REMOTE. Event #3 OFF gives LOCAL Setpoint Selection.

Note: Figure 5 (page 9a) shows the use of event #3.

Program #1 consists of segments 1 thru 6. The actual segments that cause temperature changes and soak times are segments 1 thru 4.

Note that event #3 is programmed ON for these four segments and keeps the setpoint under control of the programmer.

Segment 5 is very special as it has "0" time, the same setpoint value as the previous segment and Event #3 is programmed OFF.

When the program runs, the programmer will complete segment 4, go to segment 5 and jump immediately to segment 1 if 25 loops (or cycles) have not been completed. Thus, the programmer stays in Remote Setpoint Mode for the program. At the completion of the 25th cycle, the programmer will stay in segment 25, stop and display E.O.P. (End Of Program). Event #3 is OFF in segment 25 and consequently will turn control of the setpoint back to the Controller Setpoint digitswitch.

Pushing the Start Button on the programmer will restart Program #1 at segment 1.

C. Position "C" connects line 23 in the ribbon cable to 0V permanently and selects REMOTE Mode if the ribbon cable is connected to the controller Digital Interface Port and the controller has the LOCAL/REMOTE Switch in the Remote Position.

C233ADD1:APPLICATION #1

SETPOINT PROGRAMMER
OPERATING INSTRUCTIONS

INTRODUCTION

The JC Systems Setpoint Programmer is a microcomputer based instrument for use with JC System Temperature Controllers. The Setpoint Programmer has been specifically designed for ease of programming and use. The Operator is sequentially led through the programming steps in a non confusing manner.

The programmer allows automatic sequencing of temperature/events versus time such as is required in temperature cycling or time dependent temperature processing.

Temperature program parameters controlled are rate of temperature change, soak time (time at a specific temperature), setpoint temperature and deviation limits. In addition, three relays are provided for turning external devices on and off (Events).

In most temperature testing and temperature dependent processes, temperature is adjusted manually or with a set of cams that must be specifically designed and controlled for the operation. The JCS Programmer performs temperature change functions automatically by carrying out the stored instructions in its non volatile memory.

By executing temperature cycles automatically, a high degree of temperature reliability and precision is assured. Other safeguards include a keylock which permits program changes only when the key is in the "Reprogram" position.

FUNCTION

The Programmer determines the temperature controller setpoint through the "rate, temperature, soak-time, deviation, and events" programs stored in its memory. A program may have up to 30 segments and may be repeated up to 9999 times before the associated temperature controller is automatically shut down. Multiple programs may be stored in memory, provided that the total munber of segments plus program separators does not exceed 30.

A program review function allows the operator to sequentially step through all program parameters and observe them on the

six-digit numeric display.

The first two digits of the display are the program segment number; the last four represent the program function. A red LED corresponding to rate, setpoint, soak time, process deviation or event status will also be ON indicating which function is being displayed.

EXTERNAL EVENTS

Isolated relay closures are provided so that up to three external events may be activated by wiring to the terminal strip on the back of the Programmer. When the event is turned ON, the relay contacts are closed.

SPECIFICATIONS

Setpoint: -99.9 to +799.9 (0 to 7999 on 1° resolution controllers)

Temperature resolution: 0.1° (1° for a 1° Resolution Controller)

Soak time resolution: 1 min.

Soak time duration: 1-9999 min. (only starts when process Temperature is within 0.4° (4° for 1° resolution controller) of desired setpoint.)

Process deviation limits: ± 0.1 to $\pm 799.9^{\circ}$

Program segments: 30

NOTE: One segment contains

(a) RATE OF TEMPERATURE CHANGE
(b) NEW TEMPERATURE SETPOINT
(c) SOAK TIME AT NEW TEMPERATURE
(d) ALLOWABLE PROCESS DEVIATION
(e) ON/OFF DETERMINATION OF THE THREE EXTERNAL EVENTS (ISOLATED RELAY CONTACTS)

Program repeats: 0-9999

Program input: 16 key numeric pad

Indicators: Power ON, Rate, Setpoint, Soak Time, Process Deviation Limits, Events, Review, "End of Program"/Cycles,and Run.

External Events: three, controlled by relay closures.

Rate: 99.9°/minute max (Clear causes execution of a "step" function and is displayed as "----".)

OTHER FEATURES

Automatic repeat cycle: allows selection of the number of times the preprogrammed temperature sequence is to be executed (up to 9999).

Keypad: a keypad is provided for easy data entry, advance, backup, turning on events, and clear functions.

Display: a six-digit LED display with the first two digits representing the segment number and the last four digits representing program functions.

Process Deviation Limits Alarm: flashing LED on the front panel of the programmer indicates temperature deviation limit has been exceeded. An alarm output is provided on the terminal strip on the back panel. (See separate writeup on "Dev. Limits Alarm".)

Power On: (on bench top unit only) located on the back panel to prevent accidental turn OFF of the Programmer.

Keylock: allows reprogramming only when in the "Reprogram" position. In the "Program Lock" position, no program changes are possible.

Hold Function: allows the operator to stop a program and hold, to examine parameters, etc. without interrupting the sequence of program execution. Program execution resumes upon pressing the START button.

DEFINITIONS

Temperature Program: a set of instructions stored in the memory of the programmer. It includes a series of temperature setpoints, rates of temperature change, time at which the temperature stays at a particular setting, process deviation limits, external event enable instructions, number of cycles, and an E.O.P. (end of program) separator segment.

Program Segment: one of a possible 30 segments of the complete temperature program. It includes rate, setpoint, soaktime, process deviation limits and events.

Rate: the rate of temperature change expressed in degrees per minute.

Setpoint: the temperature at which the program will stay during the soaktime.

Soak Time: a period of time during which the program stays at a pre-selected Setpoint Temperature (expressed in minutes.)

Process Deviation: the amount by which the process temperature may deviate from the setpoint. The deviation is expressed in degrees and must be the same for positive and negative deviations.

Events 1-3: three separate isolated relay closures brought ou to the rear of the unit - their status is determined by the program for each segment of the program.

SWITCH FUNCTIONS

Front Panel: (Refer to Figure 1)

Keypad:

0-9: for entry of numeric values into the program.

***:** used as a decimal point.

#: used to enter a minus sign.

Advance: ("A" on keypad) used to advance program parameters displayed during program review.

Backup: ("B" on keypad) used to examine the previous parameter when reviewing the program.

NOTE: The "A" and "B" keys have slewing capability, i.e. if held down, they will continuously scan through memory.

Clear: ("C" on keypad) used to clear displayed data or turn off all three events if displaying event status.

Data Entry: ("D" on keypad) must be pushed whenever data is to be stored in the memory.

NOTE: NO INFORMATION IS STORED UNLESS THE "DATA ENTRY" (D) KEY IS PUSHED AND THE KEYLOCK IS IN THE REPROGRAM POSITION. THE DISPLAYED PARAMETER IS THEN STORED IN PROGRAM MEMORY.

Start: push to start the temperature program.

Hold: push to stop the program's execution. (Does not turn off heat/cool.) - Program can be resumed by pushing START button.

End Program/Cycles: used to set the number of times the temperature program is to be executed and to define the end of the program.

Review: push to review the stored Rate, Setpoint, Soak Time, Deviation, and Event functions.

Reset: push to return to the first segment of the displayed program while in REVIEW or HOLD mode.

Keylock: disables the "DATA ENTRY (D)" key to prevent program changes when in the "Program Lock" position.

Back Panel: (Refer to Fig. 2).

Power: turns on AC power to the programmer. This switch must be on at all times for the programmer to be operative.

INDICATORS

Power: LED to indicate that power is ON.

Start: LED to indicate that the program is running.

Cycles: LED to indicate that the number of program executions is displayed.

Review: LED to indicate that the REVIEW mode is selected.

Program Function LEDS: There is a seperate LED for rate, setpoint, soak time, process deviation limits and events. Each LED is turned ON when the parameter corresponding to it appears on the display. The setpoint LED is turned ON while the process temperature approaches the setpoint. The soaktime LED turns ON while the program is in the soak function.

OPERATING THE PROGRAMMER

The programmer has the following modes:

(a) Start/Run

(b) Hold

(c) Review and Reprogram

(d) End Program/Cycles

REPROGRAM

The Reprogram mode is the most important because it is in this mode that the data for the temperature program is stored into the Setpoint Programmer's memory.

To write the temperature program, determine the desired setpoint temperatures, soak times, and rates of temperature change, allowable process deviations, and any external events required and write them down on a PROGRAMMER WORKSHEET.

It is helpful to plot the temperature program on a chart as shown in Figure 3 and list the program parameters on the programming worksheet shown in Figure 4.

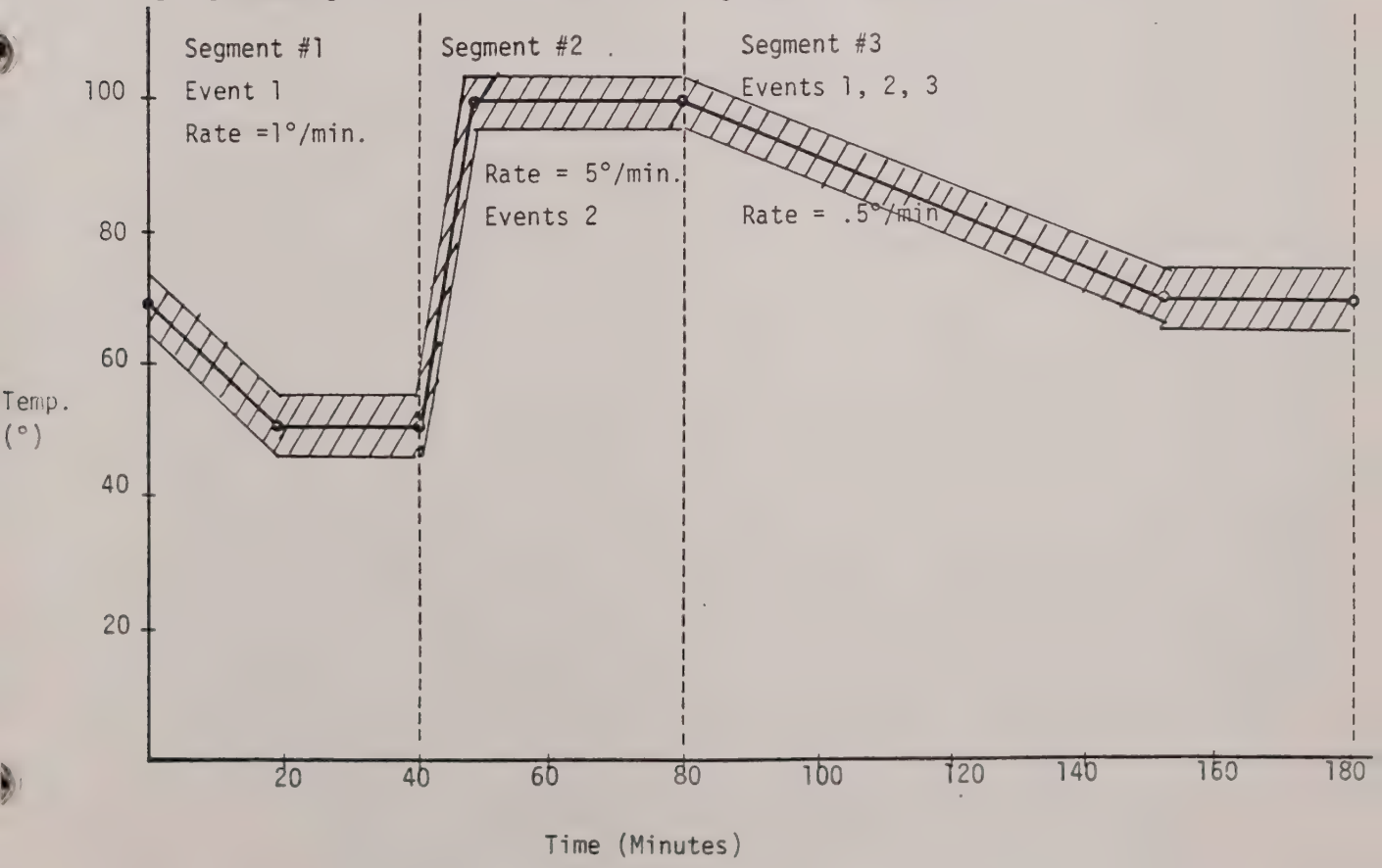

Figure 3

Date: _____

JC Systems PROGRAMMER WORKSHEET

Program: _____

SEGMENT	RATE	SETPOINT	SOAK TIME	PROCESS DEV.	EVENTS		
	°/min.		(min.)	±° LIMITS	3	2	1
1	1.0	50	20	5			1
2	5.0	100	30	5		2	
3	.5	70	40	5	3	2	1
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Total program cycles LP = 4 (End of Program set by pushing End Program/ Cycles button.)

NOTE: 1. Press DATA ENTRY after each item gas been keycd in.
2. Program Segment Display should show the first program segment number before START is pressed.

Figure 4

SAMPLE WORKSHEET OF MULTIPLE PROGRAMS
JC Systems PROGRAMMER WORKSHEET

Date:_____
Program:_____

	SEGMENT	RATE	SETPOINT	SOAK TIME	PROCESS DEV.	EVENTS		
		°/min.	°C	(min.)	±° LIMITS	3	2	1
	1	----	-55	10	4	3		
#1	2	----	+25	5	4	3		
	3	----	+85	10	4	3		
	4	----	+25	5	4	3		
DUMMY	5	----	+25	0	4	-		
E.O.P.	6	*25	CYCLES					
	7	----	-55	10	4	3		
#2	8	----	+25	5	4	3		
	9	----	+125	10	4	3		
	10	----	+25	5	4	3		
DUMMY	11	----	+25	0	4	-		
E.O.P.	12	*10	CYCLES					
	13	----	-65	10	4	3		
#3	14	----	+25	5	4	3		
	15	----	+150	10	4	3		
	16	----	+25	5	4	3		
DUMMY	17	----	+25	0	4	3		
E.O.P.	18	*15	CYCLES					
	19	----	-65	10	4	3		
#4	20	----	+25	5	4	3		
	21	----	+200	10	4	3		
	22	----	+25	5	4	3		
DUMMY	23	----	+25	0	4	-		
E.O.P.	24	*20	CYCLES					
	25	----	-65	10	4	3		
	26	----	+25	5	4	3		
#5	27	----	+300	10	4	3		
	28	----	+25	5	4	3		
	29	----	+25	0	4	3		
E.O.P.	30	*20	CYCLES					

#1 #2 #3 #4 #5

Total program cycles LP = __*__ (End of Program set by pushing End Program/ Cycles button.)

NOTE: 1. Press DATA ENTRY after each item gas been keyed in.
2. Program Segment Display should show the first program segment number before START is pressed.

Figure 5
Page 9a

Date: _____

JC Systems PROGRAMMER WORKSHEET

Program: _____

SEGMENT	RATE	SETPOINT	SOAK TIME	PROCESS DEV.	EVENTS		
	°/min.		(min.)	±° LIMITS	3	2	1
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Total program cycles LP = _____ (End of Program set by pushing End Program/ Cycles button.)

NOTE: 1. Press DATA ENTRY after each item gas been keycd in.
2. Program Segment Display should show the first program segment number before START is pressed.

Date: _____

JC Systems PROGRAMMER WORKSHEET

Program: _____

SEGMENT	RATE	SETPOINT	SOAK TIME	PROCESS DEV.	EVENTS		
	°/min.		(min.)	±° LIMITS	3	2	1
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
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20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Total program cycles LP = _____ (End of Program set by pushing End Program/ Cycles button.)

NOTE: 1. Press DATA ENTRY after each item gas been keyed in.
2. Program Segment Display should show the first program segment number before START is pressed.

Reprogram (continued)

Having listed the functions for each program segment (up to 30, including the E.O.P. separator, are permitted), determine the number of times the temperature program is to be repeated. It is important to keep a written record of the temperature program. This will facilitate data entry into the Programmer and be a useful reference.

ENTERING PROGRAM DATA

The rate of temperature change selected should be one that the system can follow. If the change rate selected is not possible, the Programmer will wait until the environment reaches within 0.4° (4° for hi temp unit) of the desired temperature before proceeding with the program.

PROGRAMMING EXAMPLES

The "Rate" function in the first segment of the temperature program will start from ambient temperature. In the example in Figure 3, segment 1 begins with a room ambient temperature of 75°.

The program parameters include a process deviation of 5° for all segments of the program. Soak times and temperature change rates vary and various events are turned on for each program segment.

The program is to be executed four times before the programmer shuts the temperature controller down automatically.

The program for this is as follows:

<u>Segment 1:</u>

Rate: 1°/min.
Setpoint: 50°
Soak time: 20 min.
Process deviation: $\pm 5^{\circ}$
Events: 1

<u>Segment 2:</u>

Rate: 5°/min.
Setpoint: 100°
Soak time: 30 min.
Process deviation: $\pm 5^{\circ}$

Events: 2

Segment 3:

Rate: .5°/min.
Setpoint: 70°
Soak time: 40 min.
Process deviation: ±5°
Events: 1,2,3

Segment 4

E.O.P. - LP = 4

DATA ENTRY INSTRUCTIONS

(If a program has been running, press HOLD.)

1. Put the keylock in the "Reprogram" position.

2. Make sure that power is ON.

3. Press the REVIEW button.

4. The first segment of the program to be overwritten (replaced) and the RATE LED should be ON. If not, press the RESET button.
Multiple Programs: To enter a new program without overwriting an existing one, advance the display to the next segment past the E.O.P. separator of the existing program.

Observe that the RATE LED is ON. Enter the rate parameter for segment 1 on the keypad. A "1.0" will be displayed in the four-digit section of the display corresponding to a one degree per minute rate of change of temperature.

If an entry error is made, press the CLEAR button and re-enter the proper data.

6. When the display indicates the rate parameter desired, press the DATA ENTRY button ("D" on the keypad), causing the displayed value to be stored in memory and automatically advancing to the next parameter to be entered.

7. The Setpoint LED will come ON, indicating that the setpoint parameter is to be entered.

8. Enter 50 on the keypad and push the DATA ENTRY button.

9. The Soak time LED will come ON. Enter 5 on the keypad and press the DATA ENTRY button.

10. The deviation LED will come ON. Enter 5 on the keypad and press the DATA ENTRY button.

NOTE: If no process deviation limit is desired for the segment, press the CLEAR button (C) on the keypad, then push DATA ENTRY (Dashes will be displayed).

11. To enter EVENTS, press CLEAR to reset any previously entered events, and enter "1". The display will show "1...E". Push the DATA ENTRY button.

12. The Segment Number section of the display will now advance to the next program segment. Proceed, entering all functions for segments 2 and 3.

13. After all data for all segments have been entered, and the segment display is indicating the next (unused) segment,push the End Program/Cycles button. The segment number is now replaced by "LP" (for loops i.e. cycles). Note: do not reset before pressing End Program/Cycles Button. The segment number displayed prior to entering the End Program Mode will be defined as the End Of Program (E.O.P.) separator.

14. Enter 4 on the keypad for 4 cycles of the program. Push the DATA ENTRY button and the Programmer will display the segment number of the first segment in the program, as it is automatically positioned at the start of the program.
Turn the Keyswitch to the Program Lock Position.

PROGRAM REVIEW

After the program has been entered, it is a good idea to review it to assure that all data has been correctly entered.

To review, press the REVIEW button and be sure that the key switch is in the LOCKED position. The display will indicate the program segment and the numbers shown in the Program Function portion of the display will correspond to the function indicated by the ON LED. To step through all parameters, push the ADVANCE button ("A" on keypad). This will advance the display successively through all parameters. Holding the "A" or "B" button down slews the program through the segments.

RUNNING THE PROGRAM

To run the program, push the START button.

The key can only be removed in the PROGRAM LOCK position.

When the START button is pushed, the program will start at the beginning of the segment displayed when the key switch was turned to the PROGRAM LOCK position. This feature allows the program to be started at any segment by entering the REPROGRAM MODE and advancing the segment number to the desired starting point. This feature also allows multiple programs to be stored in memory and selectively executed by calling up the starting segment number in the REPROGRAM MODE then turning the keyswitch to the PROGRAM LOCK position.

PROGRAM EXECUTION

While the program is running, the display will indicate the segment number and the LED above the START button will be ON. The program function LEDS will indicate what is shown in the Program Function section of the display.

While the temperature is changing to reach the soak temperature, the Setpoint LED will be ON and the display will indicate the actual setpoint transmitted to the controller. Process deviation is monitored at all times except during a step function if a deviation limit is programmed.

Soak time begins when the temperature is within + or - 0.4° of the setpoint. At this time, the SETPOINT LED will go OFF and the SOAK LED will come ON. The display will show the soak time remaining in the segment. During the soak time, process deviation is monitored. If the deviation limit is exceeded, the PROCESS DEVIATION LED will flash and a steady state contact closure will be present on pins 7 and 8 of the terminal strip on the rear panel and the program will stop. The program can be restarted by pushing the START button.

When the program has been completed, the programmer will automatically shut off the temperature controller and E.O.P. will appear on the display. The programmer will then stay in the HOLD mode until restarted.

The remaining sections will describe the programmer functions.

ENTERING A NEW PROGRAM

Before entering a new program turn the keyswitch to REPROGRAM, and advance or backup to the desired location of the first segment of the new program.

TO CHANGE EXISTING PROGRAM DATA

Put the keyswitch into the REPROGRAM position. If running, press HOLD then REVIEW. Advance or backup to the desired segment and change the data by pressing the appropriate keys and the DATA ENTRY button.

RESET

To stop a program and restart it at the beginning of the program, push the HOLD and and then the RESET buttons. This returns the program to its first segment. Push the START button to begin program execution.

REVIEW

Program functions may be reviewed by pressing the REVIEW button. The advance and backup buttons can be used to step or scan through the program. Program execution must have been halted previously by pressing HOLD. The REVIEW LED will be ON.

When START is pressed and the keyswitch has remained in the PROGRAM LOCK position, the program will continue from the segment where it was halted. If the keyswitch is in the REPROGRAM position during review, the program will restart from the segment shown on the display at the time it is returned to PROGRAM LOCK position.

CYCLES

Cycles is the number of times a program is executed and is the last step in program entry. Up to 9999 are possible.

If less than 30 program segments are used, the end of the sequence is defined by the entry of the Cycles function. If all 30 are used (no cycles entry) the program will cycle endlessly.

A built-in counter decrements each time the program is repeated. When the HOLD and then the CYCLES button is pressed, the number of remaining CYCLES, including the one currently being executed, is displayed.

HOLD

The HOLD mode can be used to temporarily stop the program. During this mode, the setpoint, soak timer, and cycles counter are maintained at the point where the HOLD button was pushed.

To resume the program, push the START button and the program will continue at the segment where it was stopped.

PROCESS DEVIATION

The Process Deviation Limit function in the programmer monitors the actual process temperature during temperature ramp and soak time. In the case of a "Step Change of Setpoint" i.e. "----" Rate function, Deviation limits are only monitored after the process temperature has approached to within 0.4° (4°) of the new Setpoint.

The magnitude of the deviation limit is programmable for each of the program segments; the positive and negative deviation limits must be the same.

When the deviation limit is exceeded, the PROCESS DEVIATION LED flashes. In addition, a steady contact closure is provided between pins 7 and 8 on the rear panel terminal strip.

The minimum deviation limit is 0.1° (1° on high temp units); however, it is advisable to use 2.0° as a minimum to prevent false alarms. Maximum deviation is 799.9° (7999° on high temp units).

If Process Deviation monitoring is not required for the program segment, it must be "cleared" by the "Clear Key" ("C" key on the keypad) followed by the "Enter key".

When no Process Deviation function has been selected, the display will show four dashes (----) when the Process Deviation LED is ON.

EXTERNAL EVENTS

Three relays in the programmer allow control of external events. Any combination of the three relays may be used in each program segment. The events to be turned ON must be entered for each program segment.

When the segment is running, the selected events will be ON, i.e. the relays will be closed. The selected events will remain ON (even in HOLD mode) until the next segment is executed.

A terminal strip on the back panel provides connections.

PROGRAMMING EVENTS

The keyswitch must be in the REPROGRAM position.

The Events are programmed as a function in each segment when the EVENT LED is ON. Enter the number of each "ON" event via the keypad, and then press the the DATA ENTRY button.

The right-hand position of the display will contain an "E" and the remaining segments will show which events are ON.

Pushing the CLEAR button turns OFF the events displayed, but does not alter the memory until the DATA ENTER button is finally pushed.

All events remain in this last state at the end of the program.

END OF PROGRAM

The Programmer automatically shuts off the Heat & Coolant at the end of the program sequence. Power remains on to protect the memory and E.O.P. appears on the display.

E.O.P. is determined when the last segment of the sequence is completed and the cycles counter has reached zero. To restart, press the START button. The previously programmed number of cycles will again be executed.

BATTERY BACKUP

Battery Backup is not required as the program information is stored in the Non Volatile Memory. A power fail detection circuit in the system senses loss of AC power and allows the microcomputer to store the pertinant information before the power is lost completely.

After a power failure, during program run, operation will continue from where it left off. If not "running" at the time of power failure, the programmer operation will be identical to an initial power-up situation, but the program memory will be preserved. The programmer will come up in a REVIEW mode,

displaying the first function of the program sequence.

If power is returned and, for any reason, the memory has not been preserved, the display will read HELP. Program data must then be reentered.

AUTO CHECK

In the event of a "brown out" or momentary decrease of power to the programmer or line transient, the memory will be preserved and the temperature program will automatically be continued from the point at which it was interrupted.

MALFUNCTION

If the temperature controller malfunctions for any reason, such as an open probe, exceeded temperature limits, or if it is not in the remote mode, program execution will not start, and the display on the programmer will show four dashes (----) until the malfunction or error condition is corrected.

C82233A/MNL

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	B	CORRECTED J6 PIN NOS; DELETED LED CR2 & R10; R9 WAS 270; LEDS WERE TIL112	4-20-82	
	C	J3 & J4 WAS 609-2003; ADDED J7-3 PIN P.C. MOUNT; ADDED SOLDERMASK SHT 4; ADDED Z15, Z16, Z17, R11, R12, R13, J8, JUMPER A & B	10-21-82	

MOLEX #'S 60-1101 (2403-10A) (10 PIN) J6

P.C. BD A1014 - TEMPERATURE PROGRAMMER FRONT PANEL BOARD

+5V PULSED M.B A4-9 (A10B)

+5V M.B. A4-11 (A10B)

0V M.B. A4-10 (A10B)

M.B. A2-4 (A10B) "BAT MEM" SW.

J6

ANSLEY 609-2027 J4

"BATTERY CHECK" S1

S2 "PROGRAM RESET"

S3 "PROGRAM REVIEW"

INSTALL JUMPER "A" TO DISABLE ALARM LATCH"

S5 "REPEATS"

S6 "HOLD"

S7 "RUN" (START)

"RUN DURING DEVIATION" "PROGRAM/REPROGRAM" S8

JUMP TO RUN

GND

KB1 KEYBOARD #

J4

⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

TIL 312 Z11, Z9, Z7, Z6, Z3, Z1 — CATHODE A B C D E F G

R6, R5, R4, R3, R2, R1 220

"A" "B"

+5V PULSED

C1 220 MFD, C2 .1 MFD

9374 Z12, Z10, Z8, Z6, Z4, Z2 — A0-INPUT

N.C.

GND

R11, R12, R13 200

Z15, Z16, Z17 IL-74

R14 120

CR1

CR2 "BAT CHECK"

CR3 "AC POWER"

R9 680

J8 +5V SPARE "RUN" "HOLD" "PROGRAM RESET" GND

J7 S8 "PROGRAM/REPROGRAM" KEY LOCK SWITCH (MOUNTED ON F.P.)

8213 INTEL 8212

Z14 270Ω RESISTOR PAC 4116R-001-271

LED FUNCTIONS (TYP 12 HF5082-45)

- CR4- RUN
- CR5- REPEATS
- CR6- PROGRAM REVIEW/REPROGRAM
- CR7- EVENTS (1-3)
- CR8- PROCESS DEVIATIONS UNITS
- CR9- SOAK TIME (MIN)
- CR10- SET POINT (°C)
- CR11- RATE (°C/MIN)

R7 4.7K, R8 4.7K

R1 VN10KM

J3 - ANSLEY 609-2027

LOW NIBBLE - DEC. PT

HIGH NIBBLE - DEC. PT

+5V

GND

1/2, 3/4 — STROBE N

A, B, C, D — LED INPUT

A, B, C, D — M5D INPUT

DEVICE SELECT

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
	1	A1014		1 & ON		NC

APPLICATION — EFFECTIVITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS .XX ± .03, .XXX ± .010; ANGLES ± 0° 30'. HOLE TOLERANCES: .001 to .005 +.005 -.000; .006 to .010 +.006 -.000; .011 to .020 +.010 -.000; .021 to .040 +.015 -.000.

MATERIAL ⚠ FINISH ⚠

ENGINEERING ACTIVITY

DESIGN	JC SYSTEMS INC.
DRAFTED	" 31 JULY 1979
CHECKED	
APPROV	
RELEASE	

DO NOT SCALE DWG

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JC ENTERPRISES

TITLE: PRINTED CIRCUIT BD SCH - TEMPERATURE PROGRAMMER FRONT PANEL BD. - A1014

SIZE D | CODE IDENT | 1013 | C

SCALE N.A. | SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	REVISED – REMOVED : A1485 BD ADDED: A1489 & A1493 BDS.	10-[illegible]-84	

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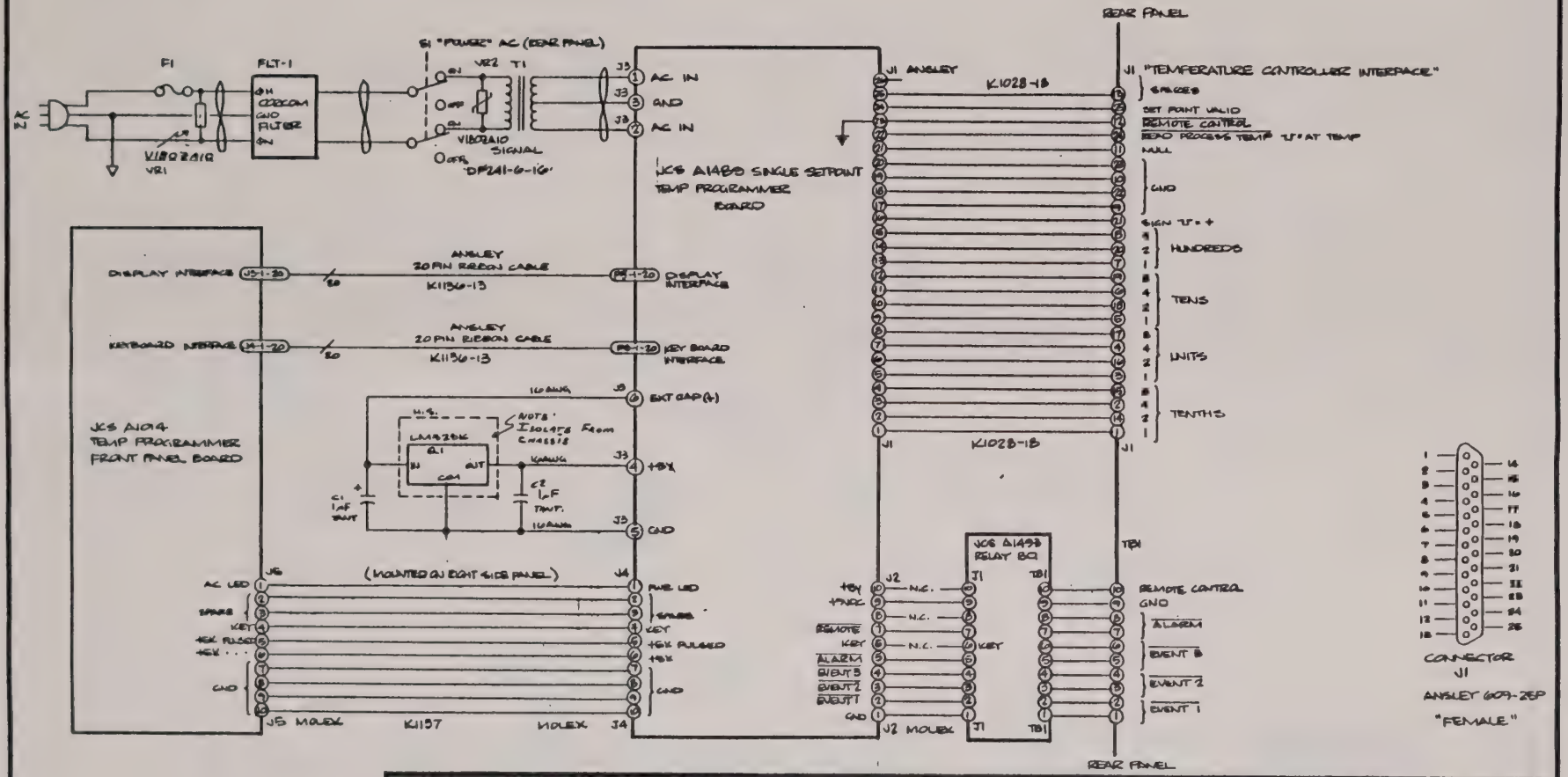


DASH	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
APPLICATION				EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
DECIMALS .XX ± .05 .XXX ± .010
ANGLES 0°30'
MORE TOLERANCES
MATERIAL
FINISH

ENGINEERING ACTIVITY

DESIGN	JCSYSTEMS INC.
DRAFTED	6 OCT 1984 MTT
CHECKED	
APPROV	
RELEASE	

DO NOT SCALE DWG

ENTERPRISES

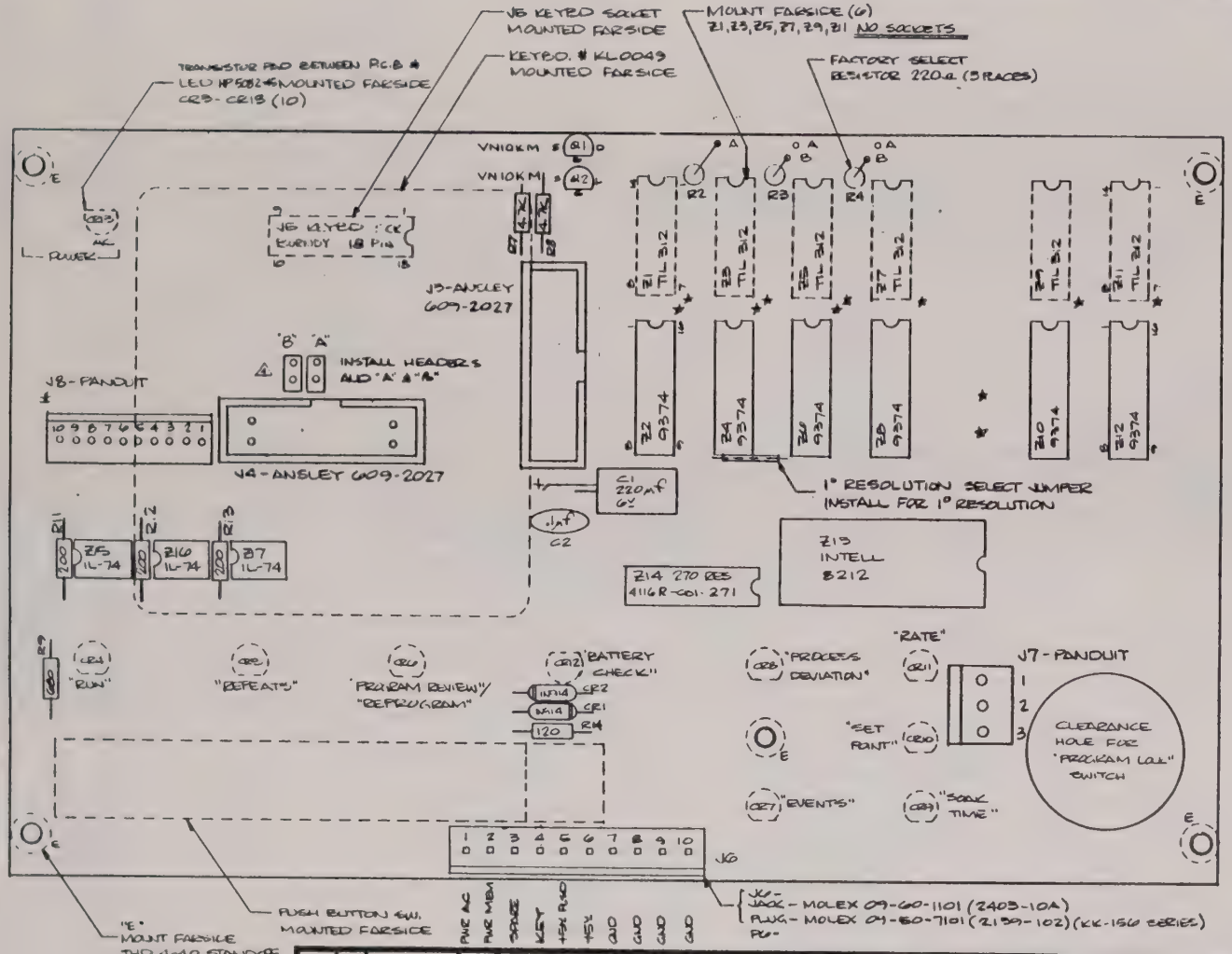
TITLE: SINGLE SETPOINT PROGRAMMER SYSTEM WIRING DIAGRAM – TEMPERATURE PROGRAMMER MODEL CB2233

SIZE	CODE IDENT		
C		1441	A

SCALE N.A. SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
		SEE SCH # 1013		



DASH QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
APPLICATION			EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: .XX ± .03, .XXX ± .010
ANGLES: 0°30'
HOLE TOLERANCES

MATERIAL
FINISH

ENGINEERING ACTIVITY

DESIGN	JC SYSTEMS INC.
DRAFTED	31 JULY 1979
CHECKED	
APPROV	
RELEASE	

DO NOT SCALE DWG

JC ENTERPRISES

TITLE: PRINTED CIRCUIT BD ASST - TEMPERATURE PROGRAMMER FRONT PANEL B.D. - MODEL A1014

SIZE	CODE IDENT		
C		1014	C1

SCALE 2:1 SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD

TO SHT 2

SHT2

BOURNS 4310R-101-223

J1-"TEMP CONTROLLER"

J2

CD4030BE

CD4050BE

CD4011BE

CD4098BE

Z4 8085

Z5 B212 "LATCH"

Z6 X2212 "RAM#2"

Z7 X2212 "RAM#1"

Z8 TMS2516 "MEM#1"

Z9 TMS2516 "MEM#2"

Z10 8243

Z11 22K RES SIP

Z12 22K RES SIP

Z13 CD4556 "DECODE"

TENTHS

UNITS

TENS

HUNDREDS

SIGN "-" = +

GND

READ TEMP

REMOTE CONT.

SETPOINT VALID

+5V(OPT)

J1- ANSLEY 609-2627

⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

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NOTES: UNLESS OTHERWISE SPECIFIED

ENGINEERING ACTIVITY	
DESIGN	JC SYSTEMS INC
DRAFTED	" 08 DEC 1982
CHECKED	
APPROV	
RELEASE	
DO NOT SCALE DWG	

JC SYSTEMS, INC.

TITLE: PRINTED CIRCUIT BD SCH- SINGLE SETPOINT PROGRAMMER MODEL A1489

SIZE D | CODE IDENT | 1488

SCALE N.A. | SHEET 1 OF 2

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD

"KEYBOARD INPUTS" J6

LSD 1 2 4 8 — FD
10 MSD 1 2 4 8 — FD
MSD 1000 1 2 4 8 — FC
100 LSD 1 2 4 8 — FC
GND

J6 ANSLEY 609-2027

Z18 - 22K SIP 4310R-101-223

Z19 - 22K SIP 4310R-101-223

+5V

Z21 40257B — "MSD" — A3 A2 A4 A1 B3 B2 B4 B1 SEL OE VCC GND — Y3 Y2 Y4 Y1

Z20 40257B — "LSD" — A3 A2 A4 A1 B3 B2 B4 B1 SEL OE VCC GND — Y3 Y2 Y4 Y1

CR2 CR3 CR4 CR5 IN914B (4)

D INT

SHT 1 N2 N3 H F J

CD4011BE Z16

CD4071BE Z17 Z17

SHT 1 R Q

CD4511BE Z13 — B A C E — Q0 Q1 Q2 Q3

CD4543B

J5 - "DISPLAY OUTPUTS"

+5V

DIGIT PAIR STROBE 4 3 2 1

GND

CD4050BE Z14 Z24 Z14 Z24 Z15 Z25 Z25 Z24 Z24

BUFFERED DATA OUT D0 D1 D2 D3 D4 D5 D6 D7

NIBBLE OUTPUT HI LO

J5 - ANSLEY 609-2027

0 1 2 3 4 5 6 7

SHT 1

HI NIBBLE L
LO NIBBLE M

SHT 1

J3 - "POWER INPUTS"

R17 1M

CR7 4002 CR8 4002 CR9 4002 CR10 4002

C11 8000 µF 15V

+5VDC A

BVAC-1
BVAC-2
GND
+5V
GND
+5VDC
PANDUIT #

— REF ONLY —

LM232 — IN OUT COM — 1µF TANT 1µF TANT

C12 .1µF C13 .1µF

CR11 CR12 CR13 CR14 CR15 IN4001 (5)

QB — COM IN OUT — 7805C — HEAT SINK

J4 "F.P. BD. POWER INPUTS"

PWR ON LED
SPARE
KEY
+5V PULSED
+5V
GND
PANDUIT #

+5V GND

C14 220µF 6V C15 .1µF C16 220µF 6V C17 .1µF C18 220µF 6V C19 .1µF

TP1 TP2 TP3 TP4

R5 20K 1% R6 10K 1% C8 .05 MYL C9 .1µF

R7 1K 1% R8 20K CW R9 22K

Z1 MC3302P

R10 22K R12 10K R13 22K R14 10M CR16 IN914B R15 22K Q7 VN10KM Q6 VN10KM R16 22K C10 1.0µF TANT

Q5 4401

R11 22K

SET P SAVE RAM K N RESET

SHT 1 +5VDC A

PWR FAIL E
PWR FAIL BYT D
SET RAM INH C

SHT 1

⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

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NOTES: UNLESS OTHERWISE SPECIFIED

DASH NO	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
APPLICATION				EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS .XX ± .03 .XXX ± .010
ANGLES 0° 30'
MOST TOLERANCES

MATERIAL ⚠
FINISH ⚠

ENGINEERING ACTIVITY	
DESIGN	JC SYSTEMS INC
DRAFTED	08 DEC 1982
CHECKED	
APPROV	
RELEASE	
DO NOT SCALE DWG	

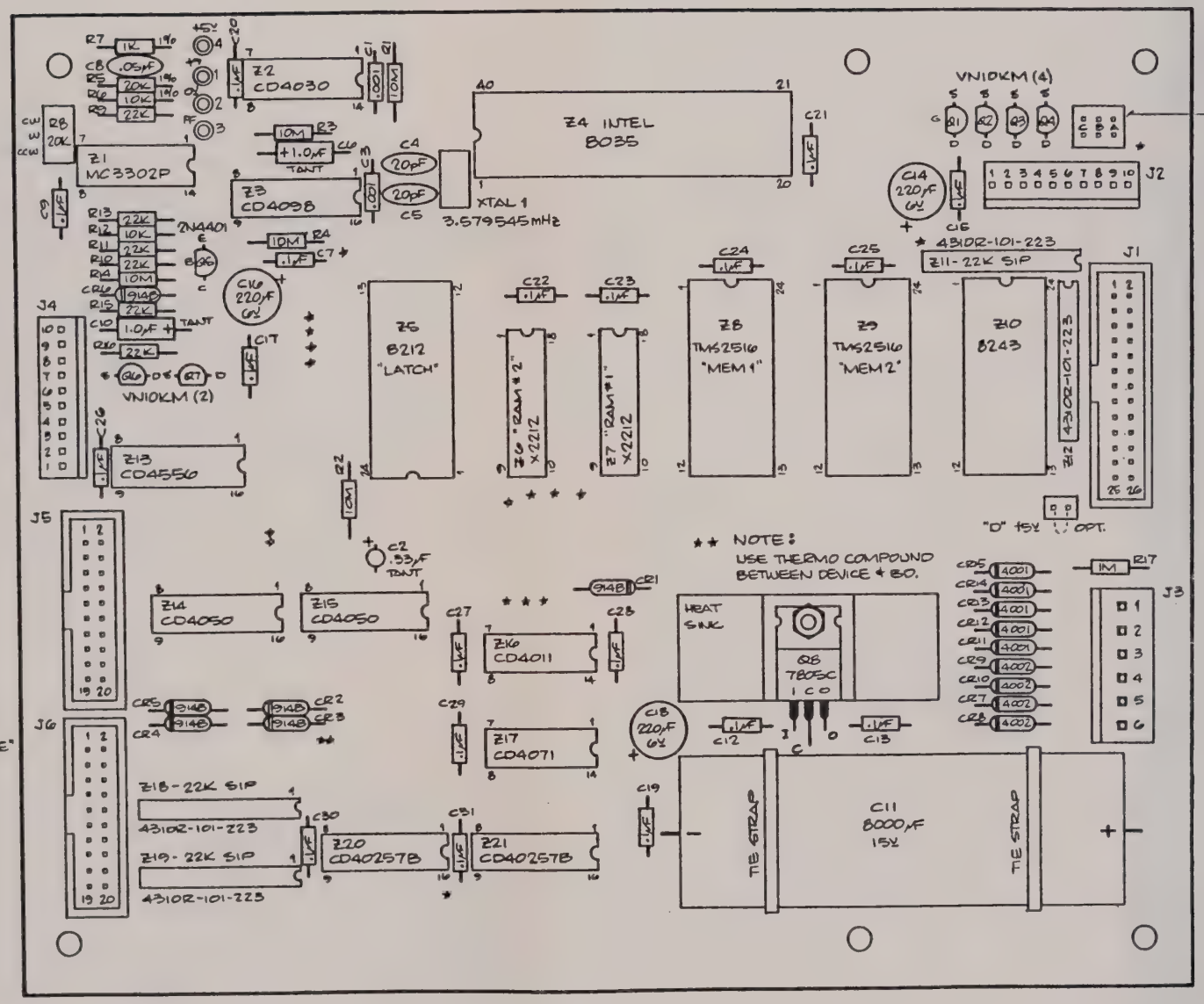
JC SYSTEMS, INC.

TITLE: PRINTED CIRCUIT BD. SCH - SINGLE SETPOINT PROGRAMMER MODEL A1489

SIZE	CODE IDENT	
D		1488

SCALE N.A. SHEET 2 OF 2

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD



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⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

QUANTITY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV	MATERIAL ⚠	
APPLICATION			EFFECTIVITY			FINISH ⚠	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS .XX ± .03 .XXX ± .010
ANGLES 0°30'
MOLD TOLERANCES

ENGINEERING ACTIVITY		
DESIGN	JC SYSTEMS INC	
DRAFTED	08 DEC 1982	
CHECKED		
APPROV		
RELEASE		
DO NOT SCALE DWG		

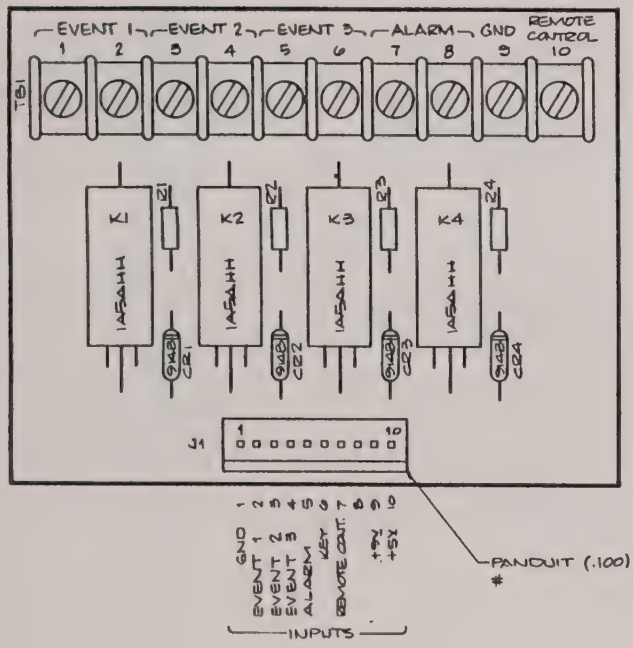
JC SYSTEMS, INC.

TITLE: PRINTED CIRCUIT BD. ASSY - SINGLE SETPOINT PROGRAMMER MODEL AK48

SIZE	CODE IDENT	
D		1489

SCALE 2:1 SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD



TB1 "OUTPUTS"
MAGNUM 1022-10

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⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON
APPLICATION			

SERIAL NO.	DATE EFF	DWG REV
EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS .XX ± .03, .XXX ± .010
ANGLES 0° 30'

HOLE TOLERANCES

MATERIAL

FINISH

ENGINEERING ACTIVITY	
DESIGN	JC SYSTEMS INC
DRAFTED	15 DEC 1982
CHECKED	
APPROV	
RELEASE	

DO NOT SCALE DWG

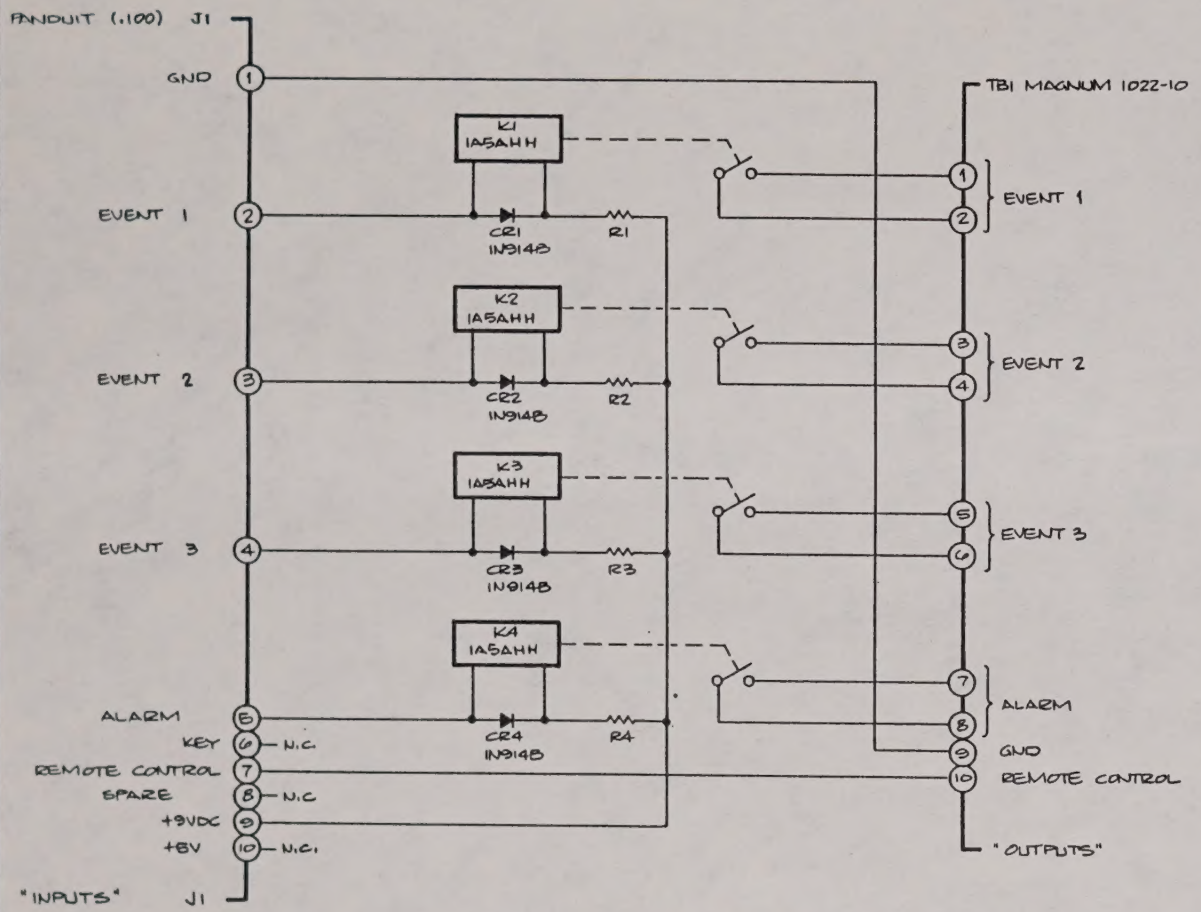
JC SYSTEMS, INC.

TITLE: PRINTED CIRCUIT BD. ASSY - RELAY BOARD MODEL A1493

SIZE	CODE IDENT	
C		1493

SCALE 2:1 SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD



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FINISH (IF APPLICABLE)

MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
APPLICATION				EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: .XX ± .03, .XXX ± .010
ANGLES: 0° 30'
HOLE TOLERANCES

MATERIAL

FINISH

ENGINEERING ACTIVITY	
DESIGN	JC SYSTEMS INC
DRAFTED	" 15 DEC 1982
CHECKED	
APPROV	
RELEASE	
DO NOT SCALE DWG	

JC SYSTEMS, INC.

TITLE: PRINTED CIRCUIT BD 6CH-RELAY BOARD MODEL A1493

SIZE	CODE IDENT	
C		1492

SCALE N.A. SHEET 1 OF 1